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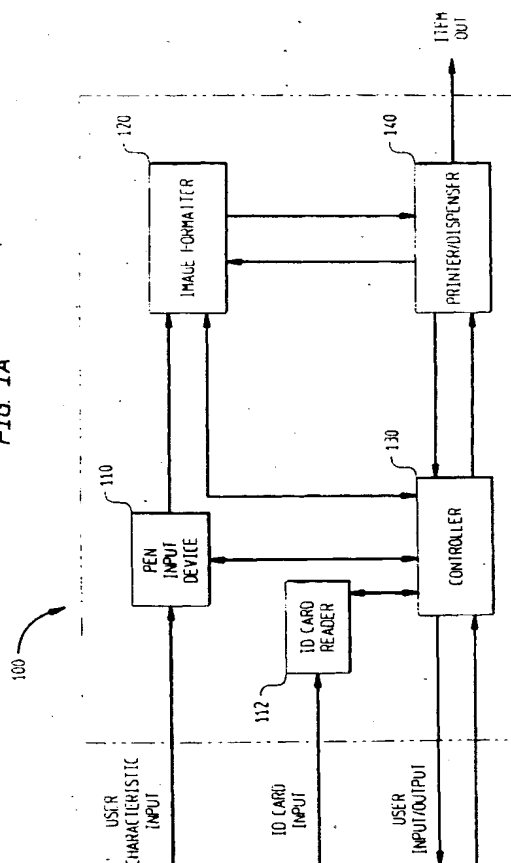
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(54) **Capture and use of a personal identification feature at a service terminal**

(57) A service terminal is provided for dispensing items with an indicium associating the item to a user accessing the service terminal. The indicium may be captured at the terminal and may include the user's signature, an electronic image of the user, or both. The indicium may be first verified with a stored electronic version of the indicium before being provided to the item for identification. Upon verification, the item with the indicium is dispensed to the authorized, verified user. The item may be a traveler's check or a negotiable instrument.

FIG. 1A

Description

TECHNICAL FIELD

This disclosure relates to pattern recognition, and more particularly relates to automatically providing personal identifying indicia to items dispensed from service terminals.

BACKGROUND

The use of automatic signature verification to identify an individual and to verify the individual's authority to complete an automated transaction at a service terminal, for example, a self-service terminal, gain control of a computer, or gain entry to a secured area, is known in the art. For example, each of U.S. Patent No. 5,257,320, issued October 26, 1993; U.S. Patent No. 5,251,265, issued October 5, 1993; U.S. Patent No. 5,111,512, issued May 5, 1992; U.S. Patent No. 5,109,426, issued April 28, 1992; and U.S. Patent No. 5,202,930, issued April 13, 1993, relate to signature capture and/or automatic verification of a captured signature.

Typically, signature verification includes the use of a pen input device to capture an electronic version of a user's signature at an apparatus incorporating the input device when the user requests access. The captured version of the user's signature is used to verify the user's identity by comparing it to a stored version of the user's signature on file. Verification is used, for example, to complete a questionable user transaction. Because of current trends towards automated services, there is a need for cost effective and time efficient methods of signature capture and to provide some form of security indicia to personally identify, and preferably to verify, the integrity of items, such as documents or goods, dispensed to a user from automated service terminals.

SUMMARY OF THE DISCLOSURE

The present disclosure provides a service terminal with the ability to capture a user's identity in some form and to attach a security mark derived from the captured identity to an item to be dispensed to the user from the terminal. The service terminal may include electronic means for verifying the user's identity after capture by comparing the captured identity to a stored electronic version of the user's identity, or by any other method of authorized user identification. Multiple personalized items may be issued from the terminal with substantially similar indicia, for example, sequentially numbered and secured negotiable financial instruments.

In one example, a method is disclosed to provide security to a document for automatic dispensing that includes first capturing a characteristic representative of an authorized receiver of the item. The characteristic is then digitized within digitizing means and then proc-

essed to provide some form of identifying mark or indicium to the document, based on the captured characteristic, before the document is dispensed to the receiver. The digitized characteristic may be verified before the document is dispensed to determine the authenticity of the receiver's authority to receive the document. The document may be any kind of document; for example, a negotiable instrument such as a traveler's check. The person who receives the items from the service terminal need not be the person whose identity is marked thereon; for example, a secretary may be authorized to receive the traveler's checks of his/her employer, but only the employer is authorized to cash them.

The step of capturing the characteristic may include capturing a signature or a form of photographic or electronic image of the authorized receiver or guarantor of the document, for example, using a signature input device or electronic camera, respectively. The term "electronic" for imaging systems described herein is defined to include video imaging. The captured characteristic may be stored in a memory at the accessed terminal or at a distinct, centralized or remote location. The memory or database may be accessed by one or multiple users. The providing of forms of identifying indicia preferably includes scaling the characteristic to at least approximately fit into a particular space allocated for the indicia on the item to be dispensed.

Another example provides a self-service terminal for dispensing documents identified with a security indicium derived from the capture of some physical identifying feature of the terminal's current user. The identifying feature is not limited to that feature captured during contemporaneous use, but may be a predetermined or predefined indicium. The terminal includes a device for generating an image in response to the user's input, and means for providing the security indicium derived from the generated image in some form on the document to identify the document with the user. Preferably, the terminal includes means for digitizing the identifying feature and means for verifying that the user providing the identifying feature is authorized to receive the document to be dispensed.

The image generating device may include a signature input device, such as a tablet, with the captured identifying feature being the user's signature. The providing means affixes or prints the user's signature to the document. The image generating device may also include an electronic camera or other means for capturing an electronic or photographic image of a portion of the user's person. The providing means includes means for printing or affixing the security indicia derived from the electronic image, the captured signature, or both, to the document in a form that is either visible or invisible to the human eye.

BRIEF DESCRIPTION OF THE DRAWINGS

The features of the disclosed personal identification

system and method will become more readily apparent and may be better understood by referring to the following detailed description of an illustrative embodiment of the present invention, taken in conjunction with the accompanying drawings, where:

FIG. 1A is a schematic block diagram of an example of a service terminal in accordance with this invention;

FIG. 1B is a schematic block diagram of a variation of the example of FIG. 1A;

FIG. 2A is a schematic block diagram of another example of a service terminal in accordance with this invention;

FIG. 2B is a schematic block diagram of a variation of the example of FIG. 2A;

FIG. 3A is another example of a service terminal in accordance with this invention; and

FIG. 3B is a schematic block diagram of a variation of the example of FIG. 3A.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now in specific detail to the drawings, with like reference numerals identifying similar or identical elements, as shown in the examples in FIGS. 1A-3B, a service terminal captures a current terminal user's identification in some form and dispenses an item from the terminal upon which a security indicium is marked. The indicium may or may not be visible to the naked eye, but is derived from the captured identification either directly or indirectly. For example, the indicium may be derived from a voice recognition device which captures a portion of a user's speech for recognition or authorization. In a preferred embodiment, the service terminal is a self-service terminal. The expression "self-service terminal", as used herein, refers to any type of apparatus that provides access to an authorized user such as a commuter ticket dispenser or an automatic teller machine from which an item is dispensed without the need for human intervention.

The term "communication", as used herein, may be any manner of communication such as electronic, optical, infrared, etc. The term "item", as used herein, refers to any type goods, such as negotiable financial instruments, personalized tickets, personalized goods, etc. which can be dispensed by a service terminal, such as a vending machine, with or without an attendant. For example, a banking self-service terminal dispenses traveler's checks with a user's pre-printed signature. The security indicium derived from the capture of a user's identifying characteristic by the terminal, is not limited to a user's signature, but may take any number of forms depending on the capture means available at the terminal. For example, a photographic identification of the user, the user's signature, the user's fingerprint, etc. may be captured and used to form all or part of the user's secu-

urity indicium. Alternatively, by appropriate user access, a predetermined indicium stored or otherwise accessed by the terminal may be provided to the item for dispensing.

Numerous methods may be used to verify the identity and/or authority of a user of a service terminal before the terminal dispenses a requested item. For example, personal identification card and keypad-entered personal identification numbers may be used. In addition to its use to identify an item to be dispensed, the service terminal may capture a user identification in some form and use it to verify that the user is authorized to receive the item to be dispensed. Preferably, a prior version of a captured user identification indicium may be stored in a memory such as a database and utilized during a contemporaneous transaction to identify the user. The memory may be local, that is, located within the terminal in current use, or may be remotely stored in a memory such as a database at a centralized or remote location. Stored therein may be information derived from but not necessarily identical to the previously captured user identification. The derived information may be in any form suitable for use in user recognition: for example, neural network parameters may be stored for corresponding neural network recognition. In addition, an electronically digitized signature contemporaneously captured at a terminal in use may be compared with a previously captured signature version which is on file in a memory located at the terminal or elsewhere. Also, a stored photographic facsimile of the user may be compared with a contemporaneously captured image of the user. Such memory-stored characteristics, however, may not be sufficient to reconstruct the exact captured indicium. While means for controlling the example service terminal are typically resident within the terminal, control may also be implemented from a point outside the terminal.

FIG. 1A shows a first embodiment of a service terminal 100. Service terminal 100 is a self-service terminal; that is, requiring no attendant input, that captures and uses a personal identification feature provided by the terminal's current user to generate a security or identifying indicium associated with the personal identification feature for affixation to an item to be dispensed from the terminal. The following disclosure refers to the item to be dispensed from the terminal, for example, as a document such as traveler's check. The service terminal affixes security indicia to any item or items dispensable from a service terminal, either self-service or attended. The indicium may be visible or invisible to the handler of the document. For example, the security indicium may include an invisible bar code or magnetic code which is readable by a point-of-sale terminal.

Terminal 100 includes a signature input device, such as a pen input device 110, operatively connected to an image formatter 120 and a controller 130. The signature input device captures the user's signature and provides the input in electronic form, in accordance with

instructions from controller 130, to the image formatter. Means for user input (not shown) such as a keyboard may also be included to provide for user/terminal interaction such as challenge/response identification of identity. An ID card reader 112 may also be included to input card-contained user identification characteristics.

The image formatter 120, in accordance with instructions from controller 130, generates an electronic version of the customer's signature as a security image to be automatically printed or stamped on a document, such as traveler's check. A printer/dispenser 140 operatively connected to controller 130 and image formatter 120, receives the formatted security image. The formatted security image is provided to the printer/dispenser 140 in a sufficient size for affixation the document, and control information defining a location on the document for the affixation is also provided to the printer/dispenser 140. As mentioned above, the security image may or may not be clearly visible to the naked eye on the marked item.

Preferably, the signature input device 110 of self-service terminal 100 includes means for digitizing the user's captured signature and means for verifying that the signature is from an authorized user. Any method and apparatus for capturing a user's signature may be utilized herein. In an exemplary embodiment, an electronic form of the user's signature, previously stored within a memory accessible by controller 130, is compared with the contemporaneously captured signature to determine authorization. The current user's captured signature also may be stored in memory for later use. Based on the comparison, the terminal either receives or fails to receive authorization to dispense the document with the identification indicium to the user. Encoding means may be provided, such as disclosed in U.S. Patent No. 5,268,963, issued December 7, 1993, which is incorporated herein by reference, which describes a system for encoding personalized identification for storage on memory storage devices.

FIG. 1B depicts a terminal 150 which is a variation of the self-service terminal of FIG. 1A described above. Terminal 150 includes means for accessing a centralized information storage 160 operatively connected to the controller 130. The centralized information storage may be a computer or some type of memory storage device that is remotely located and operatively accessible by terminal 150. Accordingly, terminal-captured electronic signatures may be transferred to/from the storage device according to requirements of the transaction, or used to verify the contemporaneous user's signature. The electronically stored signatures may also be affixed to a document to be dispensed. While the examples described with regard to FIGS. 1A-1B above refer to individual items such as documents for dispensing, multiple item dispensing may also be performed.

FIG. 2A depicts another example of a service terminal 170 as a self-service terminal that includes all the elements and interconnections of self-service terminal

100 of FIG. 1A, provided that a camera 115, such as a digital camera, is used within terminal 170 in lieu of signature input device 110 for capturing and inputting the user's image. Camera 115 is operatively connected to controller 130 and image formatter 120. When a user accesses terminal 170, an electronic or photographic image of the user is input and formatted within the image formatter to provide a formatted image which is directed to printer/dispenser 140. The formatted security image is attached or printed at a specified portion of the item before it is dispensed to the user. The captured user image may be stored electronically within a memory, such as within a database allocated for electronic, photographic or image storage for later use by the terminal.

Self-service terminal 180 of FIG. 2B includes each of the elements of self-service terminal 170 of FIG. 2A, and further includes means for accessing a centralized information storage 161 by the terminal. Centralized information storage 161 is electronic storage means which may be remotely located and operatively connected to the terminal 180. Centralized storage 161 is capable of providing an image to, or receiving an image from, the terminal using controller 130. The image provided from storage 161 may be used to generate a security mark such as a user's photographic facsimile to identify a document to be dispensed with the user. The controller 130 in either of terminals 170, 180 may include means for processing to verify that the user is authorized to complete the requested transaction. The verification may include comparing an image previously stored in either a local memory or a memory at a remote location to the contemporaneously captured photographic identification of the user.

FIG. 3A depicts another embodiment of a service terminal 190 as a self-service terminal that includes a image formatter 120, a controller 130 and a printer/dispenser 140, as in the previously described embodiments. The example of FIG. 3A also includes both a camera 115 and a pen signature input device 110. User input such as a signature is provided by the user to the signature input device 110 and an electronic or photographic image is provided by the user to the camera 115. In one example, the electronic image and electronic signature is in a digital format when provided to controller 130 and image formatter 120. Image formatter 120 processes the digitized user image and digitized user signature to format security identifiers for affixation to or printing upon a document to be dispensed. Depending on particularized operation of terminal 190, a signature, an electronic image of a user, or both, may be provided to the document to be dispensed. The user's indicia are affixed to the document for use as a security mark enabling the document to be used as a picture ID, such as a driver's license, passport, etc. The user's identification may be first verified, as discussed above, by comparing the contemporaneously captured electronic signature, or electronic image, or both, to electronically stored versions of the same.

A self-service terminal 200 is depicted in FIG. 3B, which is a variation of the terminal 190 of FIG. 3A described above. Self-service terminal 200 includes all the elements of terminal 190, and further includes means for accessing a centralized information storage 162. The centralized information storage 162 may be utilized by an individual terminal, such as terminal 200, within a system that includes multiple user-access terminals, and the centralized information storage 162 may be remotely located. The user's electronic image, electronic signature, or both, may be stored in a memory as a database at the centralized storage and provided via electronic communication means to each of the system terminals. Communication is not limited to electronic communication, and may be provided by any type of communication method. Access to centralized information storage 162 enables the controller 130 in terminal 200 to compare the contemporaneously captured electronic image or electronic signature (or both) with centrally stored versions of the same to verify contemporaneous user authenticity. The contemporaneously captured electronic identifiers may be stored for later use at either a terminal-contained memory or a memory at the remote location.

In addition, the controller 130 in each of the embodiments described above may be any means for controlling user access to any of the above-mentioned devices, or their equivalents, including communication interfaces operatively connected to the terminal interface and a controller at a location distinct from that of the self-service terminal. While the items to be dispensed are in most implementations stored within or generated by the terminal at time of use, in one example of the disclosed terminal, the terminal may also accept an item from the user upon which the identifier is to be affixed. For example, a coupon for redemption may be assessed based on some condition, and marked according to the assessment when presented by the user. The marked item is then provided to the user.

The indicia or indicium provided to the items may be generated from a captured user characteristic or identification, or may be provided as a predetermined indicium after user access is authorized or determined. While the characteristic displayed on the item is typically a single indicium, the item may be marked or identified with more than one indicium. An example of the items dispensed from the terminal may be an arrangement where an authorized item marked with a first security indicium may require further authorization from more than one user at some later stage of the authorized item's use. An example of such a transaction involves a traveler's check requiring multiple user signatures such that a user possessing the multiple "authorized" item, such as the multiple-endorsed traveler's check, may be one of a plurality of users authorized to possess or transfer the check. The plurality of people may be required to jointly authorize the use of the document; for example, a traveler's check may require countersignatures from

one or more people. Depending on predetermined rules, some or all of the people whose indicia are represented on the document, as well as other people, may participate in the authorization.

While the disclosed personal identification system and method have been particularly shown and described with reference to the preferred embodiments, it is understood by those skilled in the art that various modifications in form and detail may be made therein without departing from the scope and spirit of the invention. Accordingly, modifications such as those suggested above, but not limited thereto, are to be considered within the scope of the invention.

Claims

1. A method of marking an item processed by a service terminal, comprising the steps of:
 - a) capturing an identifying characteristic of a user requesting the item; and
 - b) providing a security mark on the item before the item is released to the user, in response to the captured identifying characteristic.
2. The method of claim 1, wherein the step of capturing includes reading a user's identity card.
3. The method of claim 1, wherein the step of capturing includes user/service terminal interaction via a keyboard and display terminal.
4. The method of claim 1, wherein the step of capturing includes digitizing the identifying characteristic.
5. The method of claim 4, further including the step of storing the digitized characteristic.
6. The method of claim 1, further including the step of verifying that the user is authorized to receive the item with the security mark affixed.
7. The method of claim 6, wherein the step of verifying is performed in response to the captured identifying characteristic.
8. The method of claim 1, wherein the step of capturing includes receiving a signature of an authorized user.
9. The method of claim 1, wherein the step of capturing includes receiving an electronic image of an authorized user.
10. The method of claim 1, further including the step of automatically dispensing the item, wherein the item is negotiable instrument.

11. The method of claim 1, wherein the step of providing includes scaling the security mark to fit within a field on the item allocated for receiving the security mark.
12. A service terminal for providing an item bearing a security indicium, comprising:
 - a) capturing means responsive to a user for capturing a characteristic of the user during terminal access;
 - b) means for marking the item with a security indicium in response to the characteristic; and
 - c) dispensing means for dispensing the item.
13. The service terminal of claim 12, further including verification means for verifying that the user is authorized to receive the item.
14. The service terminal of claim 13, wherein the verification means discriminates based on information derived from the captured characteristic and information derived from a previously stored characteristic.
15. The service terminal of claim 14, wherein the stored characteristic is stored in one of: a database within the self-service terminal and a database at a remote location operatively connected to the terminal.
16. The service terminal of claim 12, wherein the characteristic is provided in an electronically digitized format.
17. The service terminal of claim 12, wherein the capturing means includes signature input means, the characteristic is the user's signature, and the means for marking affixes a form of the signature upon a surface of the item.
18. The service terminal of claim 12, wherein the capturing means includes an electronic camera, the characteristic is an electronic image of the user, and the means for marking affixes a form of the characteristic upon a surface of the item.
19. The service terminal of claim 12, wherein the capturing means includes both a signature input device and an electronic camera.
20. The service terminal of claim 12, wherein the item is a negotiable instrument.
21. The service terminal of claim 12, further including self-service means for responding to user inputs to automatically control the capturing means, the marking means, and the dispensing means.
22. A self-service terminal for providing an identification mark to an item to be dispensed to a user from the terminal, comprising:
 - a) an identification input device for capturing a representation of a characteristic of the user;
 - b) digitizing means for digitizing the representation;
 - c) verification means for verifying that the user is an authorized user based on previously acquired characteristics associated with the user; and
 - d) formatting means for formatting the verified representation for deposition upon the item.
23. The self-service terminal of claim 22, further including means for affixing the representation upon the item.
24. The self-service terminal of claim 22, wherein the item is a document to be dispensed to the user.
25. The self-service terminal of claim 22, wherein the verification means is operatively connected to a memory storage device for storing the previously acquired characteristics.

FIG. 1A

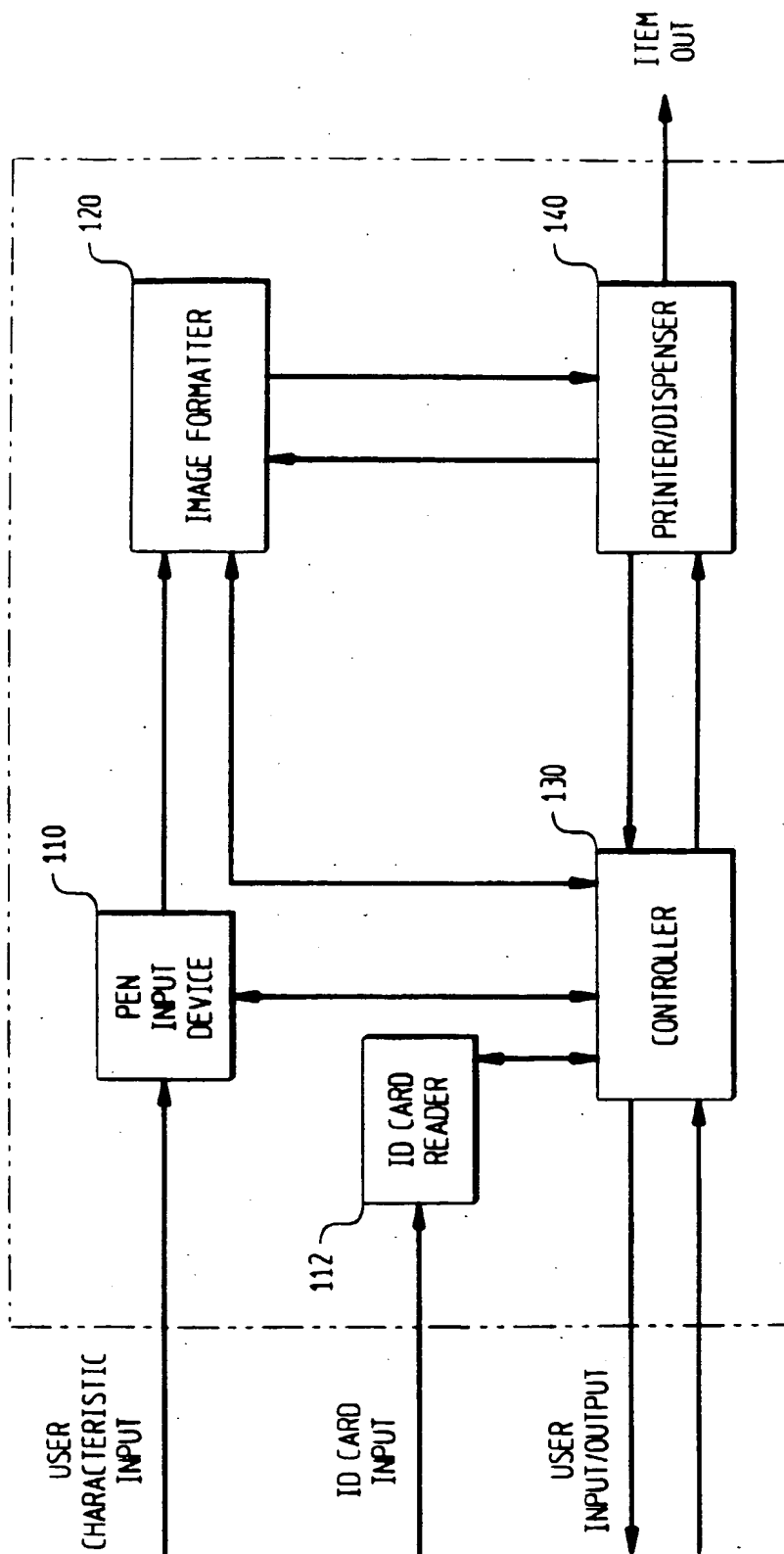
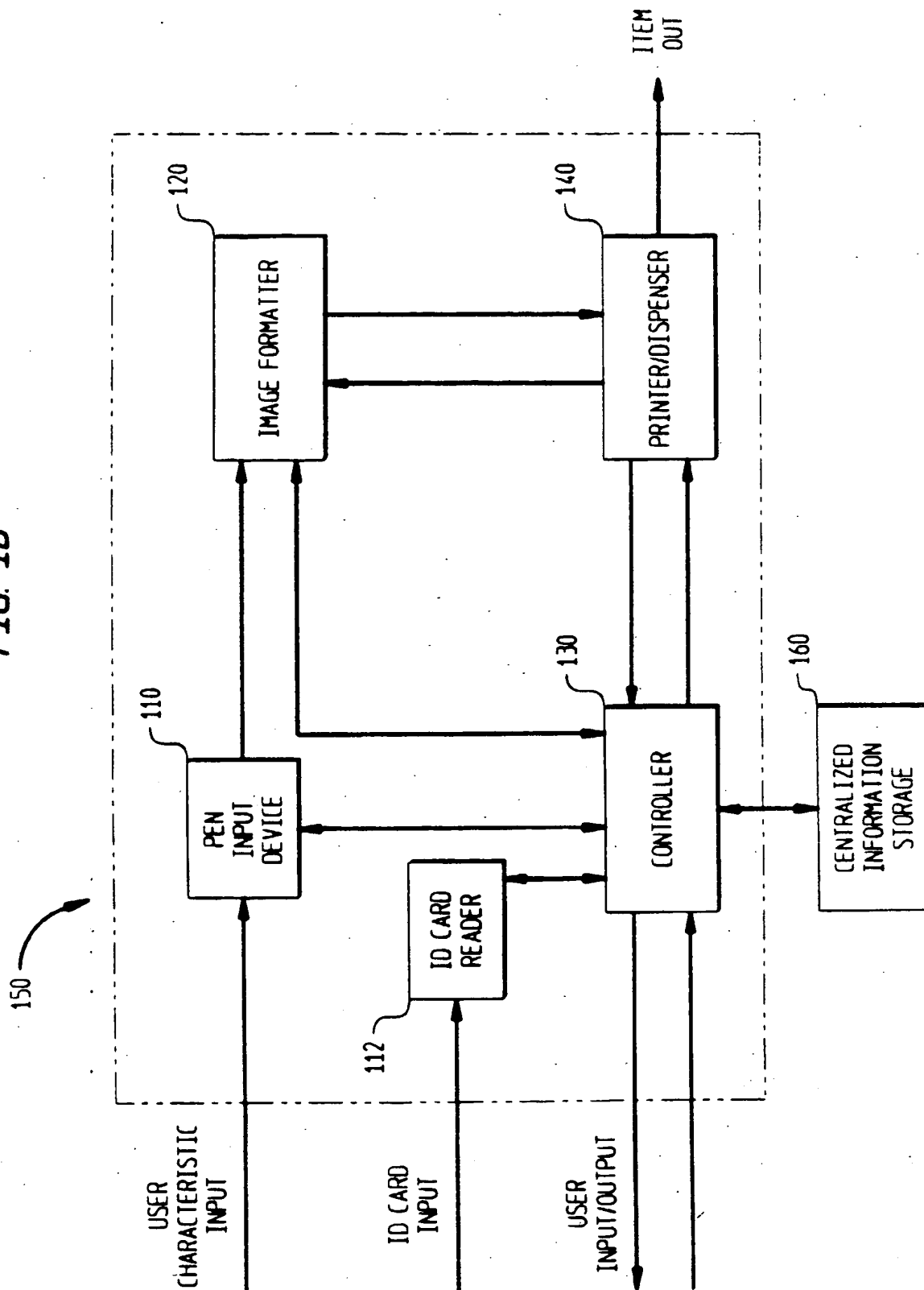


FIG. 1B



170



FIG. 2B

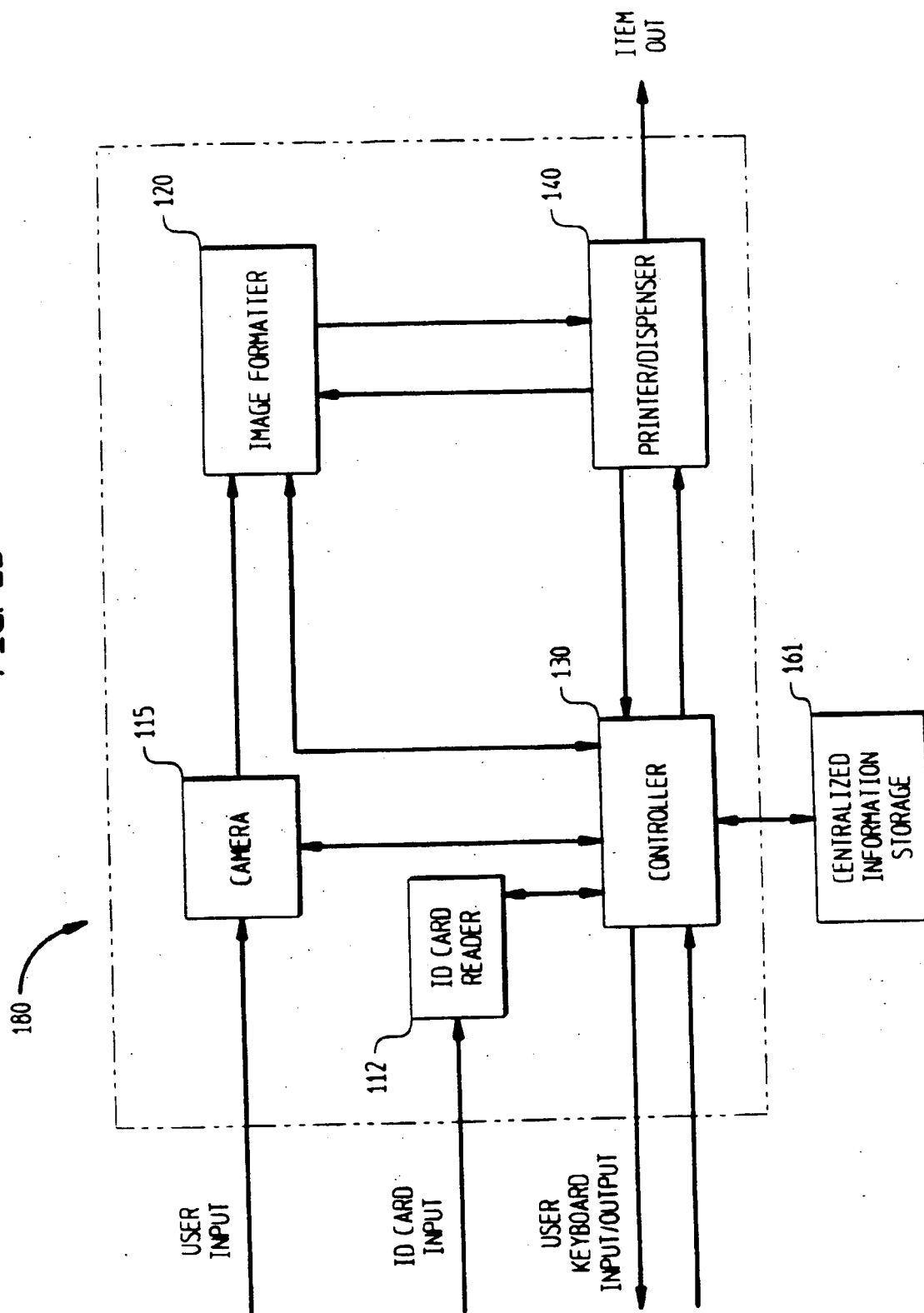


FIG. 3A

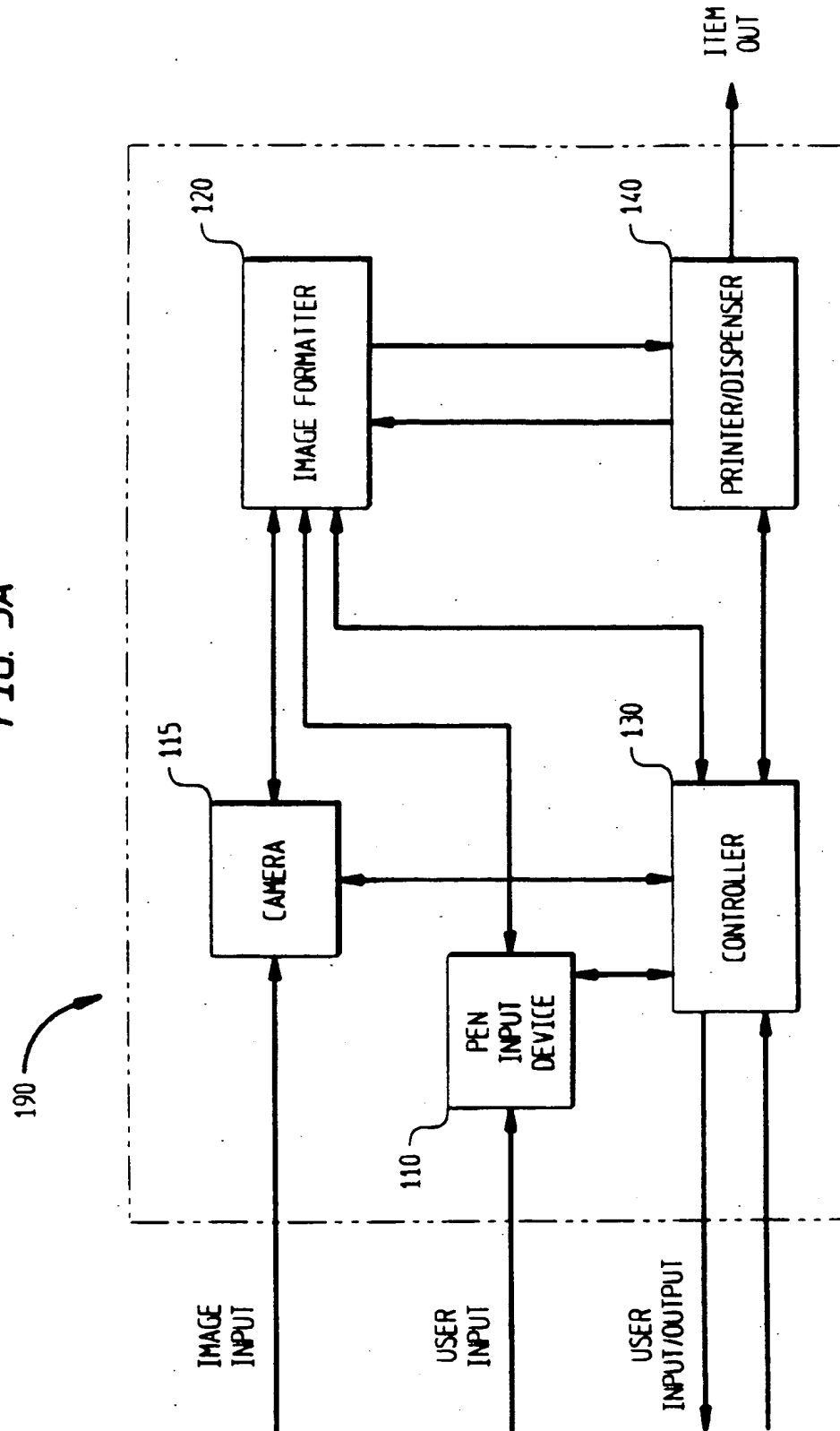
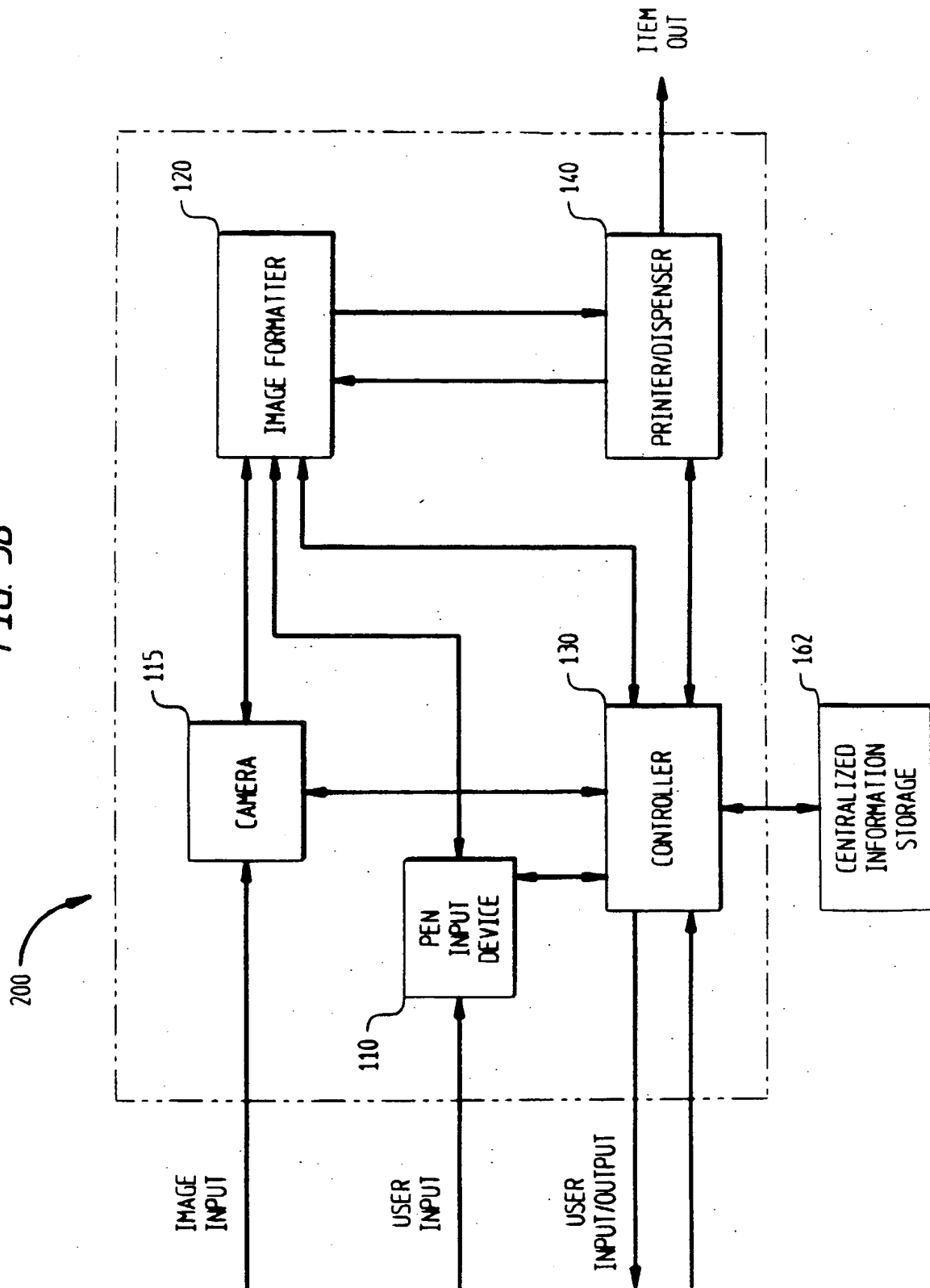


FIG. 3B



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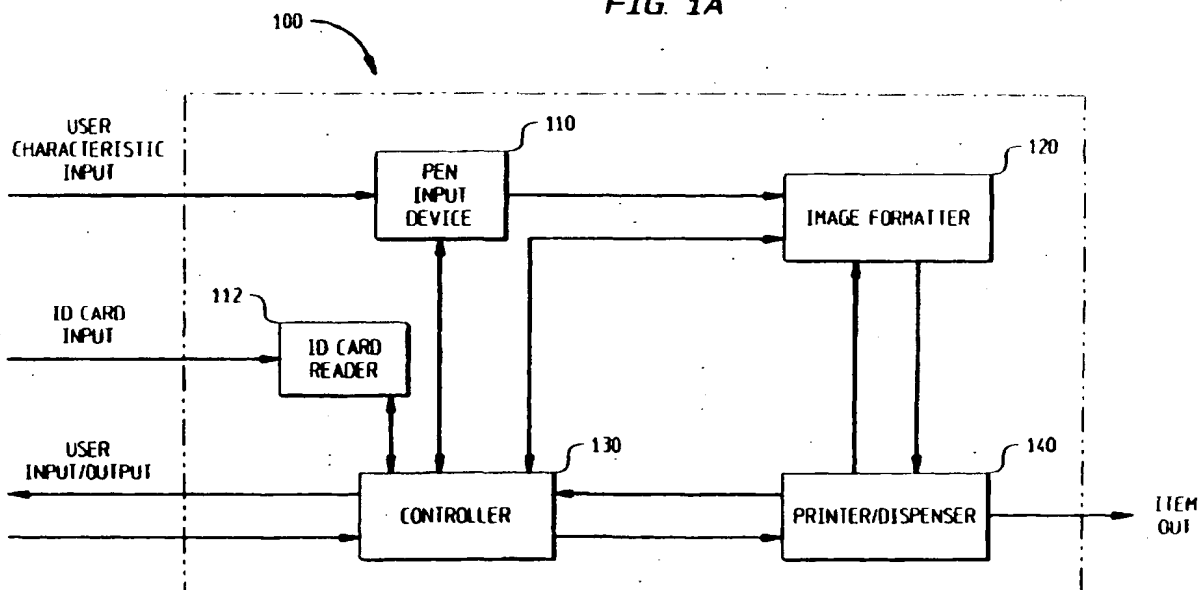
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(54) Capture and use of a personal identification feature at a service terminal

(57) A service terminal is provided for dispensing items with an indicium associating the item to a user accessing the service terminal. The indicium may be captured at the terminal and may include the user's signature, an electronic image of the user, or both. The indi-

cium may be first verified with a stored electronic version of the indicium before being provided to the item for identification. Upon verification, the item with the indicium is dispensed to the authorized, verified user. The item may be a traveler's check or a negotiable instrument.

FIG. 1A





European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 96 30 3420

| DOCUMENTS CONSIDERED TO BE RELEVANT | | | |
|---|--|--|--|
| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int.Cl.6) |
| X.P | WO 96 05576 A (PRIMA OFFICINA CARTE VALORI TU ;BOZZO FERDINANDO (AT)) 22 February 1996 * abstract; claim 1; figures 1-4 * * page 2, line 15 - page 8, line 27 * | 1-7, 10, 12-16, 20-25 | G07C9/00 G07F7/10 |
| X | WO 86 07480 A (MEDIA NET LTD) 18 December 1986 * abstract; figure * * page 3, line 15 - page 7, line 19 * * page 13, line 21 - page 15, line 22 * | 1-6, 8-13, 16-21 | |
| Y | | 7, 14, 15, 22-25 | |
| X | WO 87 03724 A (GAMMA SYSTEMS INC) 18 June 1987 * abstract; figures 1,3-7 * * page 8, line 1 - page 9, line 12 * * page 10, line 28 - page 12, line 21 * * page 15, line 12 - page 17, line 22 * | 1-6, 8-13, 16-21 | TECHNICAL FIELDS SEARCHED (Int.Cl.6) |
| X | EP 0 569 171 A (MOORE BUSINESS FORMS INC) 10 November 1993 * abstract; figures * * column 4, line 42 - column 7, line 11 * | 1,4,5, 9-11 | G07C G07F |
| A | | 12,22,24 | |
| The present search report has been drawn up for all claims | | | |
| Place of search THE HAGUE | | Date of completion of the search 21 January 1999 | Examiner Buron, E |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p> | | | |

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EUROPEAN SEARCH REPORT

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EP 96 30 3420

| DOCUMENTS CONSIDERED TO BE RELEVANT | | | |
|---|---|--|--|
| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int.Cl.6) |
| Y | US 4 385 285 A (HORST WILLIAM R ET AL) 24 May 1983 * abstract; figures 1,3,4,6A,8 * * column 3, line 25 - column 4, line 60 * * column 5, line 28 - line 35 * * column 10, line 41 - column 12, line 9 * | 7, 14, 15, 22-24 | |
| A | | 1-6, 8, 10, 12, 13, 16, 17, 20, 21, 25 | |
| Y | PATENT ABSTRACTS OF JAPAN vol. 005, no. 069 (P-060), 9 May 1981 & JP 56 017465 A (NEC CORP), 19 February 1981 * abstract * | 25 | |
| A | EP 0 171 380 A (CABLE PRINT NV) 12 February 1986 * abstract; figures 1,3 * * page 7, line 15 - page 8, line 27 * * page 10, line 19 - page 11, line 31 * | 1-3, 6-8, 10, 12-15, 17, 20-22, 24 | |
| The present search report has been drawn up for all claims | | | TECHNICAL FIELDS SEARCHED (Int.Cl.6) |
| Place of search THE HAGUE | | Date of completion of the search 21 January 1999 | Examiner Buron, E |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p> | | | |

EPO FORM 1503 03 82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 96 30 3420

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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21-01-1999

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---------------------|----------------------------|---------------------|
| WO 9605576 A | 22-02-1996 | AU 7507794 A | 07-03-1996 |
| | | BR 9408614 A | 04-11-1997 |
| | | EP 0783742 A | 16-07-1997 |
| WO 8607480 A | 18-12-1986 | AU 5990986 A | 07-01-1987 |
| | | EP 0224576 A | 10-06-1987 |
| WO 8703724 A | 18-06-1987 | AU 6524486 A | 30-06-1987 |
| | | EP 0248032 A | 09-12-1987 |
| EP 0569171 A | 10-11-1993 | CA 2095774 A | 09-11-1993 |
| | | JP 6019946 A | 28-01-1994 |
| | | MX 9302695 A | 30-06-1994 |
| | | NZ 247560 A | 26-04-1996 |
| | | US 5748755 A | 05-05-1998 |
| US 4385285 A | 24-05-1983 | CA 1170771 A | 10-07-1984 |
| | | EP 0075006 A | 30-03-1983 |
| | | JP 2018511 B | 25-04-1990 |
| | | JP 58500498 T | 31-03-1983 |
| | | WO 8203485 A | 14-10-1982 |
| EP 0171380 A | 12-02-1986 | FR 2568039 A | 24-01-1986 |

EPO FORM P0459

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